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suggestiveness. If any criticism were to be passed upon it, it would probably be that it is expanded beyond any real need for even the elementary student. Some of the discussions are almost interminable. This lack of condensation is however remedied in some measure by the full marginal analysis of the subject-matter of each paragraph.

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The Psychology of Thinking. By IRVING ELGAR MILLER. New York: Macmillan, 1909. Pp. xxv+303. $1.25 net.

The biological view of thinking and its significance for education is here presented for the lay reader and beginning student in psychology much more clearly than in any general introductory text. Heretofore the student has been obliged to pick out the functional view piecemeal, as from Angell's text, or to be content with brief statements or occasional applications, as in Thorndike's *Elements* and Judd's *Psychology.* Dr. Miller's book, however, will not take the place of an introductory text. It attempts to cover only those mental processes directly involved in thinking. Neither does it pretend to be an exhaustive treatment of the thought-process such as an advanced student would expect in a psychology of logic. Its mission is rather to make the organic nature of thought plain in non-technical language and to show what advantage this interpretation has for solving the problems of life. Instructors in psychology in normal schools and colleges will, therefore find this an exceptionally valuable supplementary text. Dr. Miller has himself used the substance of the book in his courses at the Milwaukee Normal School and in a summer course in the School of Education of the University of Chicago.

The "seed thoughts" of Dewey, to which the author acknowledges his indebtedness, form the basis for the book. Thought is set forth as an organic process arising under specific needs for adjustment. As preliminary to the study of thinking, the author sets forth the general biological point of view and compares the unconscious with the conscious modes of adjustment. He then takes up imagination, conception, judgment, and inductive and deductive reasoning, entirely from the functional standpoint. That each of these processes shows an identity of function while there is a growing perfection of its technique is one of the central ideas of his treatment. The same process can be recognized in the building-up of vague unreflective concepts as in the explicit clearly conscious construction of logical concepts. The image, the concept, and the judgment become the tools of thought in fully conscious thinking. Induction is regarded as a process of refining the tools of thought, while deduction is manifested in the use of these tools.

In pointing out the inadequacy of the older and formal descriptions of conception and reasoning Dr. Miller helps the student to understand the difference between a structural analysis of the products of the thought-process and the description of those processes as they actually occur under the vital demands for adjustment. In conception, for example, one does not start with given images to select all their common points, but one begins with a vague notion which has to be refined to meet a new situation, and the particular situation determines in what direction the refinement will be made, i. e., what memory images will be given and what characteristics selected for comparison. In similar manner the traditional accounts of induction and deduction as processes of going from particulars to the general or from the general to particulars are fundamentally incomplete, since they fail to indicate the demands out of which these processes arise or to show the use which is made of the products of these processes in the general adjustment. Dr. Miller recognizes that the fundamental problem of a functional psychology is to distinguish the different needs out of which the various processes arise. In the opinion of the reviewer the *Psychology of Thinking* succeeds better than any general text we have in psychology in setting forth the special functions of the different thought-processes. Functional psychology is probably still too young to have developed any fixed habits of expressing these distinctions. Meanwhile the beginner will bless this book for having given him a clear description and splendid illustrations of these various processes at work.

The "strong pedagogical bias" with which the book is written manifests itself in the illustrations and in several chapters where broad applications of the organic view of the mind are made to the problems of education. The author shows in a telling way the danger of methods which attempt to train only one mental faculty, such as observation or reasoning. The mutual dependence of organic processes makes such attempts questionable. When one understands how concepts develop one realizes how the symbolic activity of the mind if it is not accompanied by the process of concrete imagination may cause reading, for example, to become a "juggling with symbols." Thinking, therefore, to be vital, requires that material for thought be gained in laboratories, by excursions, etc., and that the opportunity be given to apply the thoughts in situations which are real or at least appreciated by the child. Moral and religious tenets fail to function because they are not developed by the child but are given ready-made. Manual training is of advantage primarily because it offers suitable situations to arouse the child's thought and the opportunity to use at once its refined ideas. These and many other applications give the reader the chance to test the advantage of this biological conception of consciousness which the author is teaching.

It is a pleasure also to have the process of evolution so stated as to allow for the mental contribution in that process. Biologists are too prone to state evolution, with Spencer, as a process of adaptation of man to his environment. With consciousness, man's control over his environment is markedly increased, and higher moral and intellectual elements are introduced into the process, so that it becomes in part an adjustment to man's ideals. Dr. Miller brings out this point, but with too little emphasis, it seems to the reviewer, on the importance of the introduction of valuation into the process. There is enough, however, to indicate the advantage of studying biology from the psychological point of view. Evolution is elevated to its higher terms rather than reduced to its lower material terms.

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